

What is claimed is:

1. An umbrella valve comprising:
an elastic cap;
5 an elastic stem formed integrally with the cap, having a center hollow portion, having an enlarged hollow portion proximate the cap, and having a bottom; and
a needle having an enlarged head at a proximal end thereof for being snugly secured in the enlarged hollow portion of the stem, having a lower lateral hole in a distal portion, having an upper lateral hole proximate the bottom of the stem, and
10 having a lengthwise center passageway connecting the upper and lower lateral holes.
2. The umbrella valve of claim 1 wherein the needle is stainless steel.
3. The umbrella valve of claim 1 further comprising an adhesive for bonding the
15 needle with the stem.
4. The umbrella valve of claim 1 wherein the stem has a lateral cutout opposing the upper lateral hole of the needle thereby providing at least one passage from the center passage way of the needle via the lateral cutout and the upper lateral hole of the
20 needle.
5. The umbrella valve of claim 1 wherein the upper lateral hole is unblocked by the stem.
- 25 6. The umbrella valve of claim 1 wherein the cap has a radial shaped portion and an outer edge portion adapted to seat on a flat surface.
7. The umbrella valve of claim 1 wherein the upper lateral hole extends completely through the needle.

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8. The umbrella valve of claim 1 wherein the lower lateral hole extends completely through the needle.

9. The umbrella valve of claim 1 wherein the elastic stem and the needle are
5 keyed for aligning engagement with one another.

10. The umbrella valve of claim 1 further comprising a plug adapted for receiving the needle.

10 11. An umbrella valve comprising:
an elastic cap having a sealing surface and having a stem extending from a center portion of the cap in a direction normal to the sealing surface, the stem having a center hollow portion, having an enlarged hollow portion, and having a bottom;
a needle having an enlarged head at a proximal end thereof for being snugly
15 secured in the enlarged hollow portion of the stem, having a lower lateral hole in a distal portion, having an upper lateral hole proximate the bottom of the stem, and having a lengthwise center passageway connecting the upper and lower lateral holes;
and
a plug adapted for receiving the needle.

20 12. The umbrella valve of claim 11 wherein the plug is adapted for receiving the needle and stem.

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13. A modular umbrella valve system comprising:
a plurality of elastic caps each having a radial shaped portion and an outer edge portion, the outer edge portion being formed along a mating plane, the elastic caps also each having a stem portion normal to the mating plane, each stem portion
5 having a recess of a first size; and
a needle having an enlarged head at a proximal end thereof for being snugly secured in the recess of any one of the plurality of elastic caps, the needle having a lower lateral hole in a distal portion, having an upper lateral hole proximate the bottom of the stem portion, and having a lengthwise center passageway connecting the
10 upper and lower lateral holes.
14. The modular umbrella valve system of claim 13 wherein each of the plurality of elastic caps is different with respect to at least one of preload, umbrella skirt thickness, umbrella skirt shape, umbrella skirt diameter, and material used for forming
15 the respective cap.
15. The modular umbrella valve system of claim 13 wherein each of the stem portions has a first key, the needle has a second key structured for engaging the first key, and wherein engagement of the first and second keys aligns orientation of any
20 one of the plurality of elastic caps with the needle when the one cap is mated with the needle.
16. A method of customizing an umbrella valve comprising:
providing a needle having a head at a proximal end thereof for being snugly
25 secured in a recess of any one of a plurality of elastic caps, the needle having a lower lateral hole in a distal portion, having an upper lateral hole, and having a lengthwise center passageway connecting the upper and lower lateral holes;
selecting an elastic umbrella cap from among the plurality of elastic caps, each elastic cap having the recess of a same size, by determining opening pressure factors
30 including at least one of preload, umbrella skirt thickness, umbrella skirt shape, umbrella skirt diameter, and material used for forming the respective cap.

17. The method of claim 16 further comprising installing the needle into a selected one of the plurality of elastic caps.

18. A method of preparing an umbrella type check valve comprising:

5 providing an elastic cap;

forming an elastic stem integrally with the cap, the stem having a center hollow portion, having an enlarged hollow portion proximate the cap, and having a bottom; and

10 inserting a needle having a head at a proximal end thereof into the stem by snugly securing the enlarged head into the enlarged hollow portion of the stem, wherein the needle has a lower lateral hole in a distal portion, has an upper lateral hole proximate the bottom of the stem, and has a lengthwise center passageway connecting the upper and lower lateral holes.

15 19. The method of claim 18 further comprising cementing the elastic stem to the needle.

20 20. The method of claim 18 wherein the elastic stem and the needle are keyed for aligning engagement with one another, the inserting including keyed engaging of the stem and needle.

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21. A method comprising:
- providing an umbrella valve having:
 - an elastic cap;
 - an elastic stem formed integrally with the cap, having a center hollow
 - 5 portion, having an enlarged hollow portion proximate the cap, and having a bottom;
 - and
 - a needle having a head at a proximal end thereof for being snugly
 - secured in the enlarged hollow portion of the stem, having a lower lateral hole in a
 - distal portion, having an upper lateral hole proximate the bottom of the stem, and
 - 10 having a lengthwise center passageway connecting the upper and lower lateral holes;
 - and
 - installing the umbrella valve in an orifice for relieving pressure via the orifice
 - while preventing contaminants from entering the orifice.

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